LORAIN

POWER EQUIPMENT

LORAIN MODEL RB2B

DC TO DC CONVERTER

Spec. No. 5653-001 Serial No. 2932

INSTRUCTIONS

INSTALLATION

OPERATION

MAINTENANCE

RELIANCE COMM/TEC

LORAIN MODEL RB2B

DC TO DC CONVERTER

Spec. No. 5653-001 Serial No. 2932

LORAIN PRODUCTS
Division of Reliance Electric Co.

WARRANTY

Seller warrants that the products it manufactures or sells shall be free from defects in material and workmanship during the first 90 days after the product is activated. During said period, Seller will repair or replace any defective parts free of charge to Buyer, including any labor costs. In addition, Seller shall repair or replace any defective parts, so discovered by Buyer to be defective within two years from the date of shipment of same, provided Buyer promptly so notifies Seller. In no case shall Seller's liability under this warranty extend beyond two years from the date of shipment of said product. This warranty shall not apply to any products which are misused, modified, repaired, or otherwise abused by Buyer or others. The repair or replacement of defective parts, or the refund of the invoice cost thereof, as shall be determined by Seller in its sole discretion, shall be the limit of Seller's liability hereunder and shall be Buyer's sole and exclusive remedy.

Handling or service charges in connection with the return of such products, if approved by Seller, shall be charged as determined by Seller. Seller shall not be liable in any event for any general or special, incidental or consequential damages to Buyer in excess of the amount of the purchase price of the products.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES. SELLER MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE WITH RESPECT TO ANY PRODUCTS EXCEPT AS HEREIN EXPRESSLY PROVIDED.

SYSTEMS AND EQUIPMENT NOT ECONOMICALLY RETURNABLE TO THE FACTORY

In the event that the product involved is a system or equipment which, in the judgement of Lorain Products, is not economically returnable to the factory or if Lorain Products has performed the installation, supervised the installation, or performed testing and turn-on, circuit components and Lorain repair labor are covered by this warranty for the first 90 days from date of turn-on and circuit components are warranted for two years from the date of shipment. Upon request, Lorain will send a service technician to the site to determine if the unit is defective in circuit components or workmanship, and will repair the equipment. If the failure is Lorain's fault, no invoice for circuit components or repair labor will be issued if the complaint has been issued within the first 90 days from date of turn-on. If the complaint is issued more than 90 days from the date of turn-on but within two years from date of shipment, the customer will be billed at the prevailing Customer Service rates but will not be billed for circuit components. If the problem occurs after two years from the date of shipment, circuit component and repair labor are billable.

If the problem has been created by misuse or abuse of the equipment or by malfunction of associated equipment or by environmental conditions, at any time after shipment, the customer will be billed for circuit component and labor.

GENERAL PROVISIONS

Lorain Products shall not be obligated to pay any costs or charges incurred by the customer or by any other party. In no event will Lorain Products be liable for consequential damages. No waiver, alteration or modification of any of the provisions herein shall be binding on Lorain Products unless in writing and signed by an authorized official of Lorain Products. If, during any warranty period, the subject equipment has, in the opinion of Lorain Products, been modified or misrepaired, the warranty will be void unless the modifications or repairs have been made after consultation with Lorain Products and upon the recommendation of Lorain Products.

NOTE

Part Numbering System

LORAIN is expanding its part numbering system by adding two additional numbers to the previous seven digit numbering system. All part numbers can be converted to the new system by adding -00 to the end of the old part number. As an example, Part No. 5438-008 becomes Part No. 5438-008-00 when changed to the new system. Because of conversion time, both types of numbering systems may appear in this instruction manual.

Document Changes/Revisions

LORAIN is also changing the method used to indicate changes and minor revisions to drawings. The previous system used a number to denote major changes and an alpha character for minor revisions, such as typographical errors. The new system uses an alpha character for major changes and a number for minor revisions. As an example, a drawing with an Issue 1B becomes Issue A2 with the new system. Again, because of conversion time, both systems may be used in this manual. The following table should be used as a guide to conversion to the new system:

A - 1	G - 7	N - 13	U - 19
B - 2	H - 8	P - 14	V - 20
C - 3	J - 9	Q - 15	W - 21
D - 4	K - 10	R - 16	X - 22
E - 5	L - 11	S - 17	Y - 23
F - 6	M - 12	T - 18	Z - 24

INSTRUCTIONS AND CIRCUIT DESCRIPTION
LORAIN MODEL RB2B D-C TO D-C CONVERTER

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INSTRUCTIONS AND CIRCUIT DESCRIPTION
LORAIN MODEL RB2B D-C TO D-C CONVERTER

1. RATINGS

Input: 42 to 56 volt d-c; 2.4 amperes

Output: 48 volt d-c; 2 amperes

2. DESCRIPTION

This D-c to D-c Converter supplies 48 volt output. Output load is completely isolated from input battery so that either side of the load circuit can be grounded.

Since the LORAIN D-c to D-c Converter contains no moving parts, need for periodic maintenance and adjustment is eliminated.

Two LORAIN Model RB2B D-c to D-c Converters can be operated in parallel to provide a standby power source in the event one of the Converters should fail. If output failure should occur in either parallel connected unit, a diode connected in series with its output isolates the failed unit from the paralleled unit.

3. INSTALLATION

a. Mounting

This unit is designed for 19 inch relay rack mounting. However, adapter plates are furnished as standard to permit mounting of the unit in a 23 inch relay rack, if desired. Overall dimensions are: height, 5-7/32 inches; width (exclusive of mounting angles), 17-3/16 inches; depth, 6-3/4 inches. In mounted position, this unit extends 5 inches to front of rack.

CAUTION: In mounted position, ventilating openings at top and bottom of D-c to D-c Converter must be unobstructed. The temperature of air entering the bottom of the cabinet should not exceed 50° C. A minimum of 1-3/4 inches of ventilation space should be provided between this unit and equipment mounted above or below it. This is essential to proper cooling during operation.

3. b. Electrical Connections

All electrical connections are to be made to a terminal strip at the rear of the unit.

(1) Connect load circuit power leads at OUTPUT terminals 3 (-) and 4 (+).

(2) To cause lamp OUTPUT FAIL to light and +50VDC to be extended in event of output failure, supply fused -50 volt battery to TB3 terminal 4 and connect terminal 9 to office ground. In event of an output failure, TB3 alarm terminals 1, 2, and 3 supply +50VDC and terminals 5 to 6 and 7 to 8 supply closed-loop circuits to operate external output failure alarm(s).

(3) Connect nominal 48 volt battery at INPUT terminals 1 (-) and 2 (+).

CAUTION: Input battery polarity is critical. Damage to the LORAIN D-c to D-c Converter may result from improper polarity input battery connections. Since even instantaneous voltage spikes may damage transistors, D-c to D-c Converter input should be connected directly to battery: Do not connect a filter between battery and D-c to D-c Converter input.

NOTE: Positive d-c input is connected to chassis ground by a jumper lead to protect transistors Q1 through Q4 against incorrect input polarity. If desired, this lead can be disconnected and removed after proper input connections have been made.

4. OPERATION

a. Metering

A voltmeter at front center of the LORAIN D-c to D-c Converter indicates load voltage.

b. Fuses

LORAIN D-c to D-c Converter input and output circuits are protected by fuses, carried in bayonet-type fuseholders below the output voltmeter. If necessary to replace either fuse, replace only with a fuse of the size specified below, or equivalent:

4. b. (continued)

Input fuse F1: Bussmann Type AGC, 3 ampere

Output fuse F2: Bussmann Type AGC, 2 ampere

c. Output Failure Alarm

If LORAIN D-c to D-c Converter output fails, the Converter actuates an external alarm. This condition is also indicated by red lamp OUTPUT FAIL on the Converter.

5. CIRCUIT DESCRIPTION

a. Input Circuit

Fuse F1 protects the input circuit. Choke L1 and capacitor C5 form a filter network to prevent transmission of switching transients from the LORAIN D-c to D-c Converter to talking battery. Diode CR3, across L1, clips voltage spikes generated in L1 to protect transistors in the Converter from overvoltage.

b. Oscillator

Essentially, the oscillator consists of transistors Q1, Q2, Q3, and Q4, and the primary and feedback windings of power transformer T1.

Diode CR4 furnishes a current path when positive drive voltage is applied to Q1 or Q2, since these transistors block base current when positive base to emitter voltage is applied. Resistors R1, R2, R3, and R4 limit transistor base current. Capacitors C1, C2, C3, and C4 furnish low impedance paths for drive current transients. This improves switching characteristics of the oscillator circuit.

Transistors Q1, Q2, Q3, and Q4 operate in pairs. Thus, Q1 and Q3 conduct for one half-cycle, then Q2 and Q4 conduct for the next half-cycle. When input battery is applied, one of these two pairs will conduct first. Let us assume that Q1 and Q3 conduct.

Current flows from the positive input lead through the Q1 emitter and collector, T1 primary, and Q3 emitter and collector to the negative input lead. T1 primary current induces drive current in the T1 feedback windings. Feedback windings between terminals 5 and 6, and terminals 3 and 4 apply negative drive voltage to the Q1 and Q3 bases, driving Q1

5. b. (continued)

and Q3 to greater conduction, and feedback windings between terminals 5 and 7, and terminals 1 and 2 apply positive drive voltage to the Q2 and Q4 bases driving Q2 and Q4 to cutoff.

Once drive current is induced, full input battery voltage appears across the T1 primary and current through the primary increases until the T1 core is saturated. At this time, Q1 and Q3 limit primary current, and voltage developed across the Q1 and Q3 emitters and collectors causes primary current to decay. Primary current decay reverses polarity of feedback winding drive voltages, so that Q1 and Q3 are now driven to cutoff and Q2 and Q4 are driven to conduction.

When Q2 and Q4 conduct, current flows from positive input battery through the Q2 emitter and collector, T1 primary, and Q4 emitter and collector to negative input battery. Note that T1 primary current direction is now reversed. Again, T1 primary current increases until the T1 core is saturated, at which time Q2 and Q4 cause decay of primary current to again switch the oscillator circuit.

Alternating current in the T1 primary induces alternating current in the T1 secondary.

c. Power Rectifier and Output Circuit

A bridge-type power rectifier, CR1, rectifies a-c in the T1 secondary. Positive rectifier output is connected through output fuse F2 and blocking diode CR2 to load; the negative return path is directly to negative power rectifier output.

Diode CR2 allows current to flow in only one direction through the output circuit. In event D-c to D-c Converter output failure occurs, CR5 blocks output current of a parallel-connected D-c to D-c Converter.

Capacitors C6 and C7 and choke L2 filter switching transients from LORAIN D-c to D-c Converter output. Voltmeter V indicates output voltage.

The coil of relay K1 is connected across Converter output; so long as output voltage appears across the relay coil, the relay remains operated if output failure should occur, the relay releases. Contacts of relay K1, released, supply +50VDC at TB3 alarm terminals 1, 2, and 3, short TB3 alarm terminals 5 to 6 and 7 to 8, and connect indicator lamp across alarm battery.

ELECTRICAL PARTS LIST
LORAIN MODEL RB2B DC TO DC CONVERTER
SPEC. NO. 5653-001

This Electrical Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the LORAIN EQUIPMENT is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec. No., and Serial No. as given on the equipment nameplate. The quantity of spare parts listed should be sufficient for ten or less assemblies or models for at least 18 months. If a single asterisk (*) appears in the Quantity Recm. Spares column, it indicates the part, assembly, or model is listed more than once, in which case, use the quantity where the item first appears. If two asterisks (**) appear, refer to the sub-list for that assembly or model. If a dash (-) appears, this indicates that spares are not recommended for this part or assembly.

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
ASSEMBLIES			
A1	4265-025	Relay	**
CAPACITORS			
C1	2713-178	1UF 200 Volt DC	1
C2	2713-178	1UF 200 Volt DC	*
C3	2713-178	1UF 200 Volt DC	*
C4	2713-178	1UF 200 Volt DC	*
C5	2731-250	1800UF 60 Volt, Electrolytic	-
C6	2731-238	1600UF 80 Volt, Electrolytic	-
C7	2731-238	1600UF 80 Volt, Electrolytic	-
DIODES			
CR2	2813-133	1N1200A, Silicon	1
CR3	2812-223	1N5059, Silicon	2
CR4	2812-223	1N5059, Silicon	*
FUSES			
F1	2483-233	3 Amp, Cartridge	3
F2	2483-229	2 Amp, Cartridge	3
INDICATOR LAMPS			
	2581-213	48 Volt, Filament	1

ELECTRICAL PARTS LIST
LORAIN MODEL RB2B DC TO DC CONVERTER
SPEC. NO. 5653-001

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
INDUCTORS			
L1	4415-002		-
L2	4415-002		-
METERS			
	2943-183	0-80 Voltmeter, DC	-
RECTIFIERS			
CR1	2822-030	25 Amp 200 Volt, Silicon	1
RESISTORS			
R1	2651-148	51 Ohm 3 Watt, Fixed	1
R2	2651-148	51 Ohm 3 Watt, Fixed	*
R3	2651-148	51 Ohm 3 Watt, Fixed	*
R4	2651-148	51 Ohm 3 Watt, Fixed	*
R5	2651-350	7K Ohm 3 Watt, Fixed	1
R6	2651-735	1K Ohm 5 Watt, Fixed	1
R7	2651-344	3K Ohm 3 Watt, Fixed	1
TRANSFORMERS			
T1	4516-502	Power	-
TRANSISTORS			
Q1	2848-059	2N1536	2
Q2	2848-059	2N1536	*
Q3	2848-059	2N1536	*
Q4	2848-059	2N1536	*
MISCELLANEOUS			
	2488-106	Fuseholder	1
	2584-636	Cap, Lens, Red	1
	2584-113	Lampholder	1

LORAIN PRODUCTS
SUBSIDIARY OF RELIANCE ELECTRIC
1122 F STREET LORAIN, OHIO 44052 216/288-1122
TWX 810-426-2130 (LORAIN PROD)
TLX 98-0505 (LORN PROD LORN)

ELECTRICAL PARTS LIST
LORAIN 4265-025 RELAY CIRCUIT ASSEMBLY

Spare parts are not usually required if adequate standby equipment is available and if the LORAIN equipment is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. The quantity of spare parts listed should be sufficient for ten or less RELAY CIRCUIT ASSEMBLIES for at least 18 months.

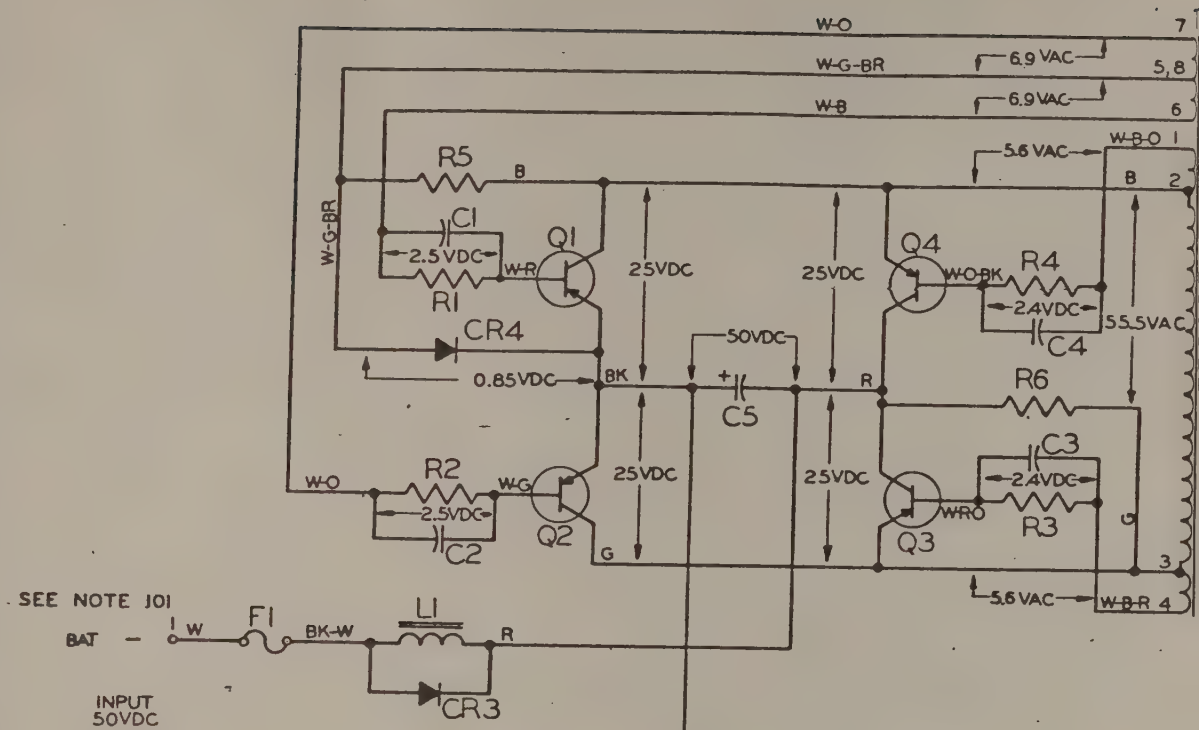
Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
K1	2543-443	Relay	1

LORAIN PRODUCTS CORP.
Lorain, Ohio U.S.A.

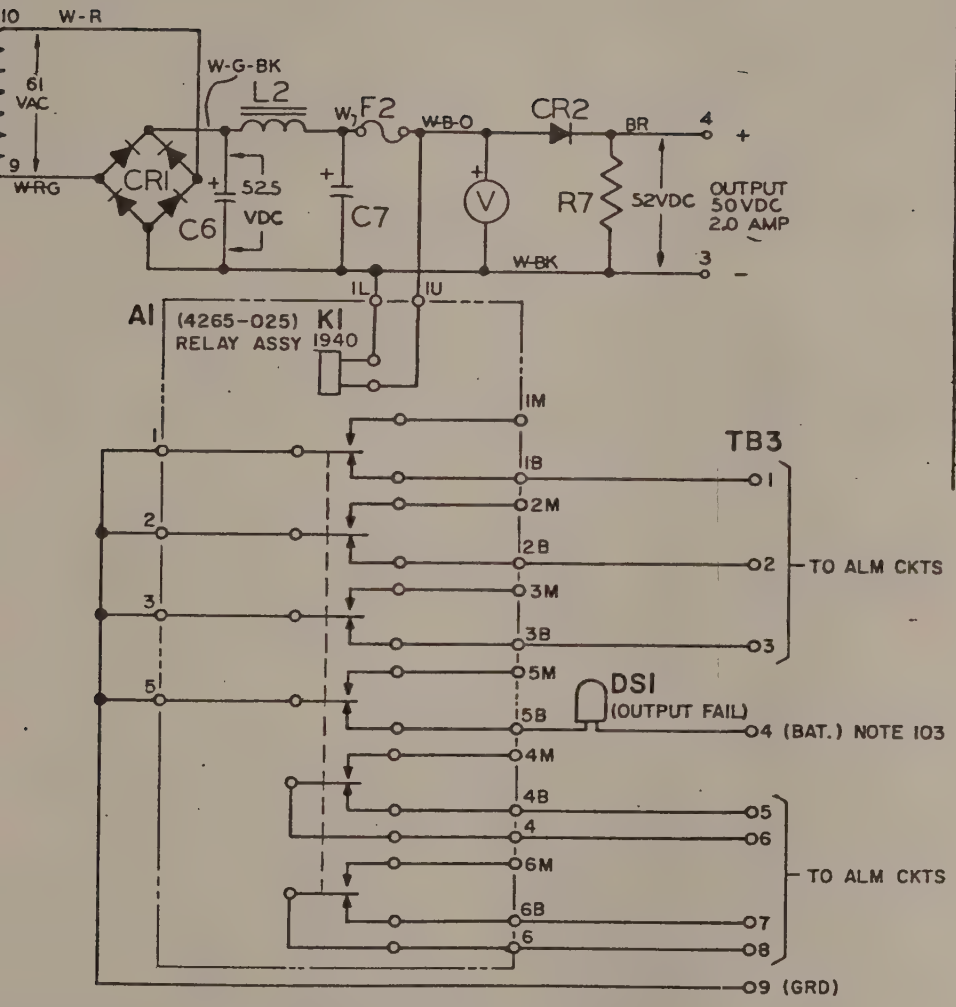
LORAIN PRODUCTS (CANADA) LTD.
St. Thomas, Ontario, Canada

dmb

Printed in U.S.A.



DESIGNATION	PART NO.	DESCRIPTION
Q1, Q2, Q3, Q4	2848-059	TRANSISTOR
CR1	2822-030	1 ϕ BRIDGE 25A 200 V PRV.
CR2	2813-133	DIODE
CR3	2812-223	DIODE
CR4	2812-223	DIODE
R1, R2, R3, R4	2651-148	51 Ω 3W
R5	2651-350	7000 Ω 3W
R6	2651-735	1000 Ω 5W
R7	2651-344	3000 Ω 3W
C1, C2, C3, C4	2713-178	1.0 UF 200VDC
C5	2731-250	1800 UF 60VDC
C6, C7	2731-238	1600 UF 80VDC
T1	4516-502	POWER TRANSFORMER
L1, L2	4415-002	CHOKE
F1	2483-233	3 AMP FUSE AGC3
F2	2483-229	2 AMP FUSE AGC2
K1	2542-891	4000 Ω RELAY
V	2943-183	0-80 VDC VOLTMETER
OUTPUT FAIL	2581-213	48V. SWITCHBOARD LAMP
	2584-636	RED LAMP CAP



RE-VIS.	CHANGE SLIP NO	DWG CNGD BY	DATE	REVISION
1	10556	M 3		CR2 WAS 64WG 3 MODEL WAS 64 RB2B19.
2	20123	5		ALARM CKT CHANGED NOTE 103 REVISED
3	1830695	5		R1-R4 WERE 2651-314, C1-C4 WERE 2715-261
4	1832458	12		ADDED VOLT RANGE ON INPUT
5	1832831	4		SPEC 5653-024 ADDED
6	1833790	12		CR1 WAS 2822-009
7	1834574	10		CR3,4 WERE 2812-121
8	1836603	4-19-78	J.H.	VOLTMETER WAS 2943-211

NOTES

101 CONNECT INPUT TO BATTERY SIDE OF FILTER IN PLANTS HAVING DISCHARGE FILTER IN SERIES WITH LOAD.

102 FRAME GRD. SHOULD BE REMOVED AFTER INSTALLATION AND TESTING.

103 TERM. 4 (ALARM BAT.) TO BE CONNECTED TO FUSED 50V. BAT.. (OTHER VOLTAGES MAY BE USED BY CHANGING THE LAMP.)

104 TEST VOLTAGES:
AC VOLTAGES MEASURED WITH 5000 Ω / VOLT RECTIFIER TYPE AC VOLTMETER THRU 0.1 UF DC BLOCKING CAPACITOR.
DC VOLTAGES MEASURED WITH 20,000 Ω / VOLT DC VOLTMETER.
ALL READINGS ACCURATE WITHIN ±5% NOMINAL INPUT VOLTAGE.
NO LOAD OUTPUT.

NOTICE

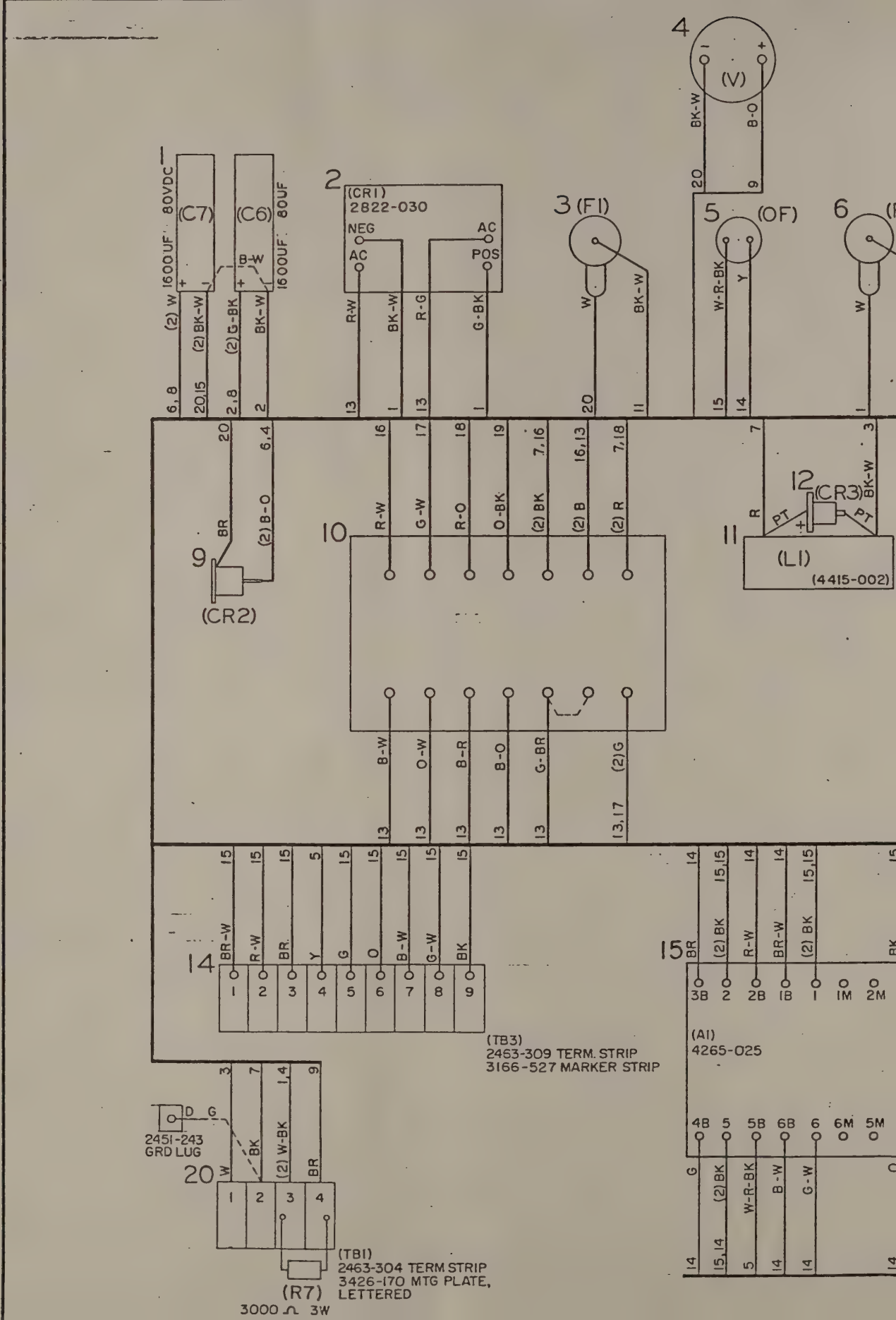
THIS DRAWING IS THE PROPERTY OF LORAIN PRODUCTS CORPORATION AND INCLUDES PROPRIETARY INFORMATION DO NOT REPRODUCE OR DISTRIBUTE WITHOUT PERMISSION OF THE OWNER. THE DRAWING IS NOT TO BE USED TO MAKE APPARATUS OR FOR PROCUREMENT PURPOSES, OTHER THAN FROM LORAIN PRODUCTS CORPORATION, EXCEPT UNDER WRITTEN AGREEMENT WITH THE OWNER.

WAS SD-1487-01

SCHEMATIC DIAGRAM FOR MODEL RB2B DC-TO DC CONVERTER

LORAIN *Products Corporation*
LORAIN, OHIO
AND
LORAIN PRODUCTS (CANADA) LTD ST. THOMAS, ONTARIO

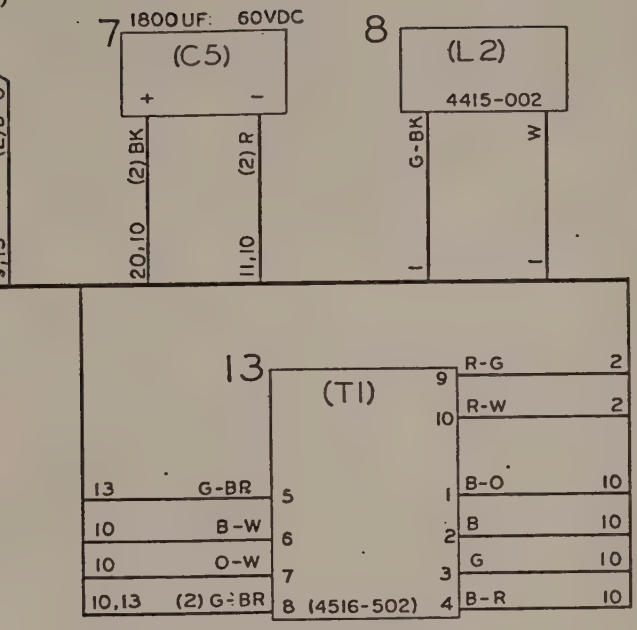
DR BY GP	DATE 5-31-62	SCALE NO	
CH BY J.L.	DATE 5-31-62	SD-5653-024	
CH BY Lee M.	DATE 5-31-62	SD-5653-001	
APP BY Bull	DATE 5-31-62		

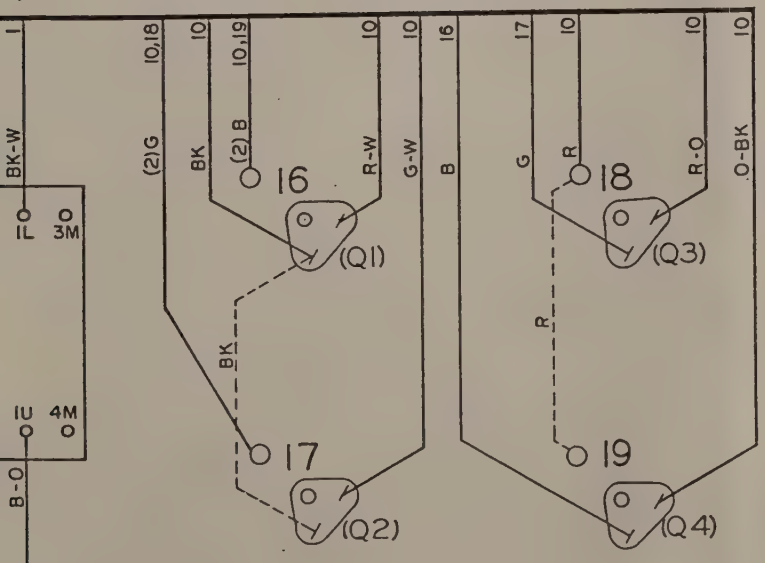

4
(V)
BK-W
B-O
20
9
(C7)
1600UF 80VDC
(C6)
1600UF 80UF
2
(CR1)
2822-030
NEG
AC
AC
POS
3 (F1)
5 (OF)
6
W-R-BK
Y
W
BK-W
R-W
R-G
G-BK
(2) W
(2) BK-W
(2) G-BK
BK-W
B-W
6,8
20,15
2,8
2
13
1
13
1
20
11
15
14
1
9
(CR2)
10
R-W
G-W
R-O
O-BK
(2) BK
(2) B
(2) R
7,16
16,13
7,18
12
(CR3)
11
(L1)
(4415-002)
PT
B-W
O-W
B-R
B-O
G-BR
(2) G
13,17
14
BR-W
R-W
BR.
Y
G
O
B-W
G-W
BK
(TB3)
2463-309 TERM. STRIP
3166-527 MARKER STRIP
15
BR
(2) BK
R-W
BR-W
(2) BK
(A1)
4265-025
3B
2
2B
1B
1
1M
2M
2451-243
GRD LUG
D
G
20
W
BK
(2) W-BK
BR
(TB1)
2463-304 TERM STRIP
3426-170 MTG PLATE,
LETTERED
(R7)
3000 Ω 3W
4B
5
5B
6B
6
6M
5M
G
(2) BK
W-R-BK
B-W
G-W

NOTES:
101 DOTTED LINES REPRESENT JUMPERS.--------
102 ASSOCIATED PRINTS:

JT-684-09A
SD-5653-001

RE-VIS.	CHANGE SLIP NO.	CHGD BY	DATE	REVISION
1	16973	4 19 67		ADDED COLOR CODING TO CRI TERM. DESIGNATION.
2	18892	5 1m 69		G GRD LEAD WAS BK
3	20123	5 12M 70		AI ADDED AT LOC 15; TB3 ADDED AT LOC 14; TBI MOVED TO LOC 20.
4	1832831	4 5 73		SPEC. 5653-024 ADDED
5	1834180	4 16 74		PT. NO. ADDED AND WIRING UPDATED FOR CRI





WAS TD-1487-01

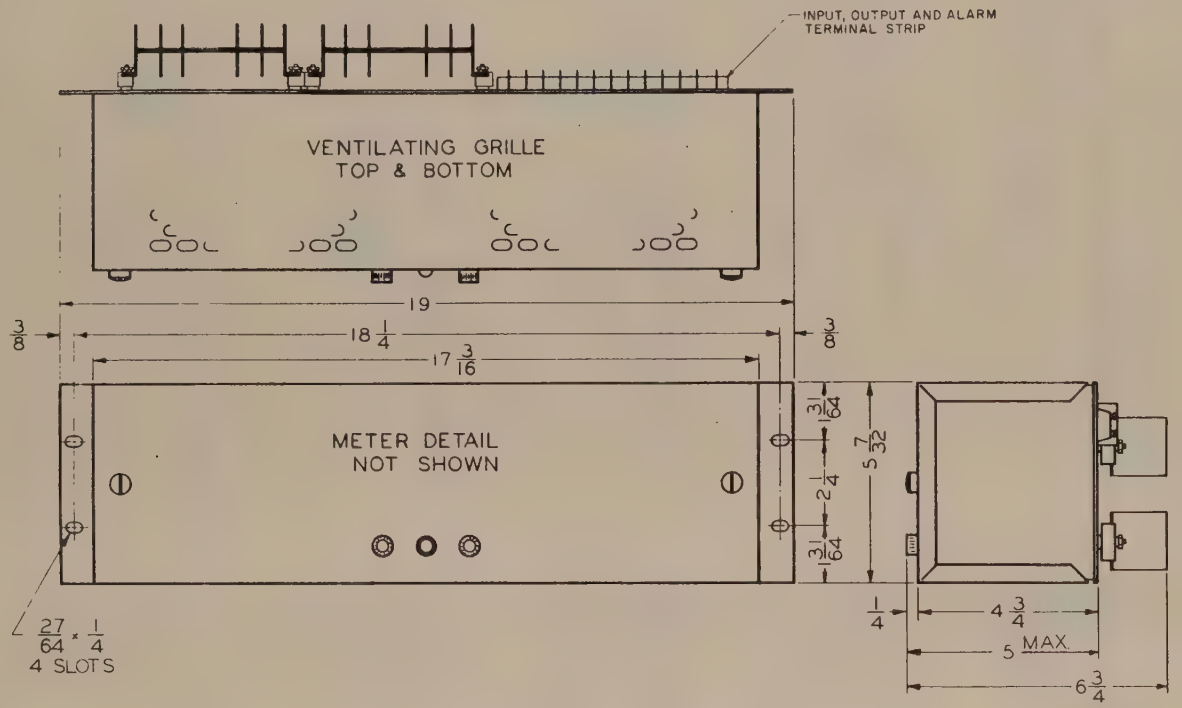
WIRING DIAGRAM FOR MODEL RB2B AND RB2B19

LORAIN *Products Corporation*
LORAIN, OHIO
AND
LORAIN PRODUCTS (CANADA) LTD. ST. THOMAS, ONTARIO

DR. BY R W	DATE 7-19-62	SCALE
CH. BY B. L	DATE 8-6-62	T-5653-024
CH. BY G.J.	DATE 8-9-62	T-5653-001
APP. BY	DATE 8-9-62	

ED-684-20

RE VIS	CHANGE SLIP NO	DRN CHKD BY	DATE	REVISION
1	4926 SP	I		MTG. SLOTS CHG'D
	CH.RB 1-20-61	13		
		61		
2	7711	D		7 APPEARANCE
	M	P		26 CHGD OVERALL
				62 DIM CHG'D
3	16994			RB2G2 ADDED



UNLESS OTHERWISE SPECIFIED, ALL FRACTIONAL DIMENSIONS SHALL HAVE A TOLERANCE OF ± 1/32 INCH, AND ALL DECIMAL DIMENSIONS SHALL HAVE A TOLERANCE OF ± 0.015

OVERALL DIMENSIONS
FOR
MODEL RB2G19 SPEC. 966-00
MODEL RB2B19 SPEC. 991-00
& MODEL RB2G2 SPEC. 5657-00

LORAIN *Products Corporation*
LORAIN, OHIO
AND
LORAIN PRODUCTS (CANADA) LTD. ST. THOMAS, ONTARIO

DR BY CJA	DATE 3-4-60	DWG	1/2
CH BY CJA	DATE 3-9-60	REV	
CK BY	DATE		
APP BY	DATE		ED-684-20

FOR PARTS OR SERVICE, CONTACT THE NEAREST

LORAIN REGIONAL SERVICE CENTER

OHIO REGIONAL SERVICE CENTER
1313 G Street
Lorain, Ohio 44052
Telephone: 216/288-1122

CONNECTICUT REGIONAL SERVICE CENTER
9-A Old Windsor Road
Bloomfield, Connecticut 06002
Telephone: 203/726-1990

ILLINOIS REGIONAL SERVICE CENTER
245 Roosevelt Road, Bldg. 2, Unit 13
West Chicago, Illinois 60185
Telephone: 312/231-5775

GEORGIA REGIONAL SERVICE CENTER
6270 McDonough Drive, Suite C
Norcross, Georgia 30093
Telephone: 404/449-0840

COLORADO REGIONAL SERVICE CENTER
4010 Youngfield St.
Wheat Ridge, Colorado 80033
Telephone: 303/422-6213

TEXAS REGIONAL SERVICE CENTER
722 N. Great Southwest Parkway
Arlington, Texas 76011
Telephone: 817/640-1134

SOUTHERN CALIFORNIA REGIONAL SERVICE CENTER
3001 Red Hill, Bldg. 6, Suite 109
Costa Mesa, California 92626
Telephone: 714/540-4395

NORTHERN CALIFORNIA REGIONAL SERVICE CENTER
2075 O'Toole Ave.
San Jose, California 95131
Telephone: 408/263-1303

CANADIAN SERVICE CENTER
122 Edward Street
St. Thomas, Ontario
Telephone: 519/631-0780

LORAIN SERVICE® CAN ALSO PROVIDE:

Audio Visual Training Programs (Slide/Cassette)

- Battery Charger Maintenance - No. L302AV
- Storage Battery Maintenance - No. L301AV
- Central Office Ground Maintenance - No. L401AV

Factory or On-Site Training School

Specialized Test Equipment

- Ringing Generator Test Set - Model LS2000
  (Includes loads, metering, digital frequency counter)
- 130V Converter Test Load - Model LS1000
  (Variable loads to 6 amps)

Power Evaluation Program (PEP)

- Power analysis program for all central office power equipment including batteries.

Power Upgrade and Modernization Services

- Including engineering, fabrication and complete installation

Maintenance Contracts

Spare Parts Kits and Fuse Kits

Handy and practical, helps keep down time to a minimum.

Contact your nearest LORAIN Regional Service Center for more information.

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